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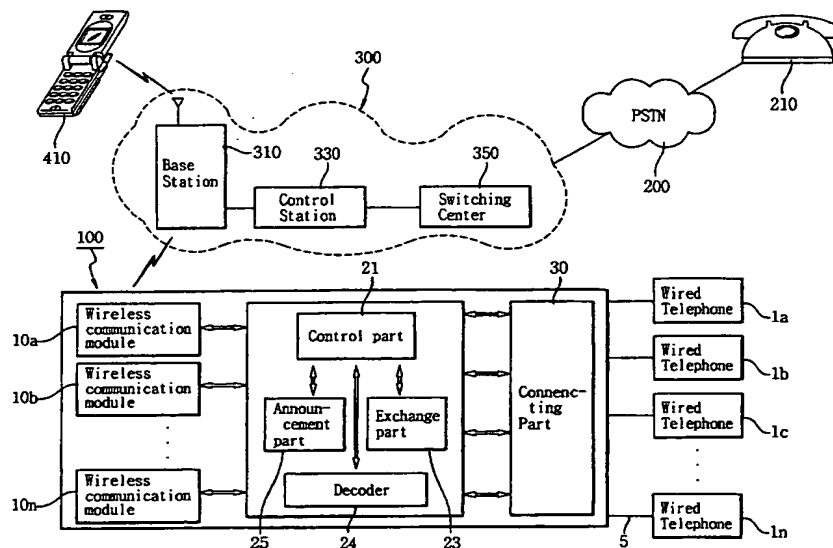
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(54) Title: A WIRED TELEPHONE COMMUNICATION SYSTEM BY MEANS OF WIRELESS COMMUNICATION MODULES AND THE METHOD FOR THE SAME



(57) Abstract: The present invention provides wired telephone communication system by means of wireless communication modules and the method for the same. The system 100 by the present invention includes a plurality of wireless communication modules (10a, 10b, 10c, ..., 10n) and a plurality of wired telephones (1a, 1b, 1c, ..., 1n). They are exchangeably switched by an exchange part and inputted signal is decoded (23) by a decoder (24). When necessary a announcement part (25) announces the necessary information. All of them are controlled by a control part (21).

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TITLE OF THE INVENTION

A wired telephone communication system by means of wireless communication modules and the method for the same

FIELD OF THE INVENTION

The present invention relates to a wired telephone communication system by means of wireless communication modules and the method for the same. Specially, the present invention makes it possible on a region which is difficult to have a telephone network in itself to make a phone-communication through a wired telephone by using the wireless communication infrastructure.

BACKGROUND

To communicate by a wired telephone, the wired telephone should be directly connected to PSTN (Public Switched Telephone Network). Although the receiver uses the mobile phone, the wired telephone of the caller should be directly connected to the PSTN. Reversely, although the caller uses the mobile phone to communicate with the receiver of the wired telephone, the wired telephone of the receiver also should be directly connected to the PSTN. These mean that the region in which the wired telephone is used should have the PSTN to achieve the phone-communication by means of the wired telephone.

The establishment of the PSTN requires a lot of time and

cost and, especially, it may be cost-inefficient to establish the PSTN on region such as a remote mountain villages or islands. The establishment of the PSTN for the islands needs the installation of the submarine cables, which increases time and cost much more. Therefore, it is desirable if it is possible to make a phone-communication through a wired telephone on the region such as the remote mountain villages or islands by using the wireless communication infrastructure.

#### SUMMARY OF THE INVENTION

The present invention is directed to a wired telephone communication system and the method for the same which satisfy the above desire. The purpose of the present invention is to provide a system and a method by which users of wired telephones on a region can communicate with others by making use of wireless communication network. In one aspect of the present invention, the present invention provides a system and a method by which users can communicate by means of wired telephones without establishment of the PSTN. In another aspect of the present invention, the present invention provides a system and a method which are movable by which users in a region on which the system is equipped can communicate by means of wired telephones, the telephones being without connection with the PSTN.

The system according to the present invention includes a plurality of wireless communication modules each of which transmits telephone signal to wireless telephone network and

receives telephone signal from the wireless telephone network; a wired telephone connecting part to which a plurality of wired telephones are connected, each of the wired telephone having its own telephone number; an exchange part which exchangeably switches the wireless communication modules and the wired telephones connected to the wired telephone connecting part; an announcement part which announces necessary information for telephone call to the wireless communication modules or the wired telephones switched to the exchange part; a decoder which decodes a telephone signal into data inputted from the wireless communication modules or the wired telephones switched to the exchange part; and a control part connected to the wireless communication modules, the wired telephones connected to the wired telephone connecting part, the exchange part, the announcement part and the decoder, the control part which controls the operation of them.

In a preferred embodiment of the present invention, representative telephone number is assigned to one of the wireless communication modules and forwarding numbers are assigned to the remained wireless communication modules so that when the wireless communication module of the representative telephone number is in use, the telephone signal is forwarded to other wireless communication module. Accordingly, user of outside phone can call only by the representative number.

It is desirable if the exchange part further exchangeably switches between the wired telephones connected to the wired telephone connecting part. In that case, communication between

the users of the wired telephones connected to the wired telephone connecting part is possible.

In a preferred embodiment of the present invention, the exchange part includes a wireless communication module exchange part which switches the wireless communication modules and a wired telephone exchange part which switches the wired telephones connected to the wired telephone connecting part, and the decoder includes a wireless communication module decoder which decodes the telephone signal from the wireless communication modules switched to the wireless communication module exchange part and a wired telephone decoder which decodes the telephone signal from the wired telephone switched to the wired telephone exchange part.

In a preferred embodiment of the present invention, the control part includes converting means which converts button signal data into corresponding letter data and the button signal corresponding to letter on button inputted through the wired telephone are decoded into the button signal data by the decoder and the button signal data is delivered to the control part in which the converting means converts the button signal data into letter data and the control part delivers the letter data to the wireless communication module which transmits the message data to the outside SMSC, by which the SMS is sent.

In the present invention, the control part includes wireless communication module checking means for checking whether the wireless communication modules receive the telephone signal; receiving wireless communication module to exchange part

switching and decoder operating means which, when the wireless communication module receives the telephone signal and communication mode is established, switches the wireless communication module to the exchange part and operates the decoder; object wired telephone identifying means which reads own number data of the object wired telephone from the decoder and identifies the object wired telephone; and object wired telephone to the exchange part switching means which switches the identified object wired telephone to the exchange part.

Further, the control part further includes an object wired telephone number input announcing means which operates the announcement part to announce an information to input the object wired telephone number to the receiving wireless communication module when the receiving wireless communication module is switched to the exchange part and the decoder is operated.

Also it is desirable if the control part further includes judging means for judging whether the object wired telephone is in use by checking the telephone signal of the object wired telephone when the object wired telephone is identified; and busy information announcing means which operates the announcement part to announce that the object wired telephone is in use to the receiving wireless communication module when the object wired telephone is in use.

In the present invention, the control part includes a judging means judging whether there is a call try by the wired telephones; wired telephones to the exchange part switching and decoder operating means which switches the wired telephone trying to

call and operates the decoder; resting communication module searching means which searches the wireless communication modules in order to find a resting communication module by checking telephone signal of the wireless communication modules; outside phone identifying means which identifies an outside object phone by reading outside phone number data which is decoded by the decoder inputted through the wired telephone; resting communication module to the exchange part switching means for switching the searched resting communication module to the exchange part; and outside object phone number to resting communication module input means for inputting the outside object phone number data identified by the outside phone identifying means to the resting communication module.

In that case, the control part further includes busy information announcing means which operates the announcement part to announce line-busy information to the wired telephone trying to call when the resting communication module searching means fails to find a resting communication module.

Also, the control part further includes completion checking means for checking whether the input of the outside object phone number is completed on the wired telephone trying to call.

The control part includes call try identifying means between the wired telephones which identifies call try by the wired telephone is directed to the other wired telephone so that the control part controls the exchange part to switch between them.

The method according to the present invention includes the steps of wireless communication module checking step by a control



part for checking whether the wireless communication modules receives telephone signal; receiving wireless communication module to exchange part switching and decoder operating step for switching the wireless communication module to an exchange part and operating a decoder when at least one of the wireless communication module receives the telephone signal; object wired telephone number delivering step which decodes an object wired telephone number signal into data inputted from outside caller by the decoder and delivers the object wired telephone number data to the control part; and object wired telephone to exchange part switching step which switches the object wired telephone to the exchange part by the control part when the control part reads the object wired telephone number data and identifies the object wired telephone.

At this case, it is desirable if the method further includes the steps of an object wired telephone number input announcing step in which an announcement part announces an information to input the object wired telephone number to the receiving wireless communication module when the receiving wireless communication module is switched to the exchange part and the decoder is operated.

Further, the method includes the steps of judging step in which the control part judges whether the object wired telephone is in use by checking the telephone signal of the object wired telephone when the object wired telephone is identified; and busy information announcing step in which the announcement part announces that the object wired telephone is in use to the

receiving wireless communication module when the object wired telephone is in use.

The method according to the present invention includes the steps of wired telephone call-try judging step by a control part for judging whether there is a call try by wired telephones; wired telephones to the exchange part switching and decoder operating step which switches the wired telephone trying to call to an exchange part and operates a decoder connected to the exchange part; resting communication module searching step which searches wireless communication modules in order to find a resting communication module by checking telephone signal of the wireless communication modules; outside object phone number delivering step in which the decoder decodes outside object phone number signal from the wired telephone trying to call into data and the outside object phone number data is delivered to the control part; outside object phone number identifying step in which the control part reads the outside object phone number data and identifies the outside object phone; resting communication module to the exchange part switching step for switching the searched resting communication module to the exchange part; and outside object phone number to resting communication module input step for inputting the identified outside object phone number data to the resting communication module.

In that case, it is desirable if the method further includes the steps of busy information announcing step which operates the announcement part to announce line-busy information to the

wired telephone trying to call when there is a fail to find a resting communication module in the resting communication module searching step.

#### BRIEF EXPLANATION OF DRAWINGS

Fig. 1 is a view showing configuration of a wired telephone communication system by means of wireless communication modules according to the preferred embodiment of the present invention;

Fig. 2 is a view showing configuration of an exchange part and a decoder part of the preferred embodiment of the present invention in which the exchange part and the decoder part are separated into those of a wireless telephone communication module side and those of a wired telephone side;

Fig. 3 is a sequence chart showing the operation of the preferred embodiment of the present invention when trying to call an object wired telephone from the outside;

Fig. 4 is a sequence chart showing the operation of the preferred embodiment of the present invention when trying to call to the outside from the wired telephone;

Fig. 5 is a flow chart showing the operation of a control part of the preferred embodiment of the present invention when trying to call the object telephone from the outside; and

Fig. 6 is a flow chart showing the operation of the control part of the preferred embodiment of the present invention when trying to call to the outside from the wired telephone.

DETAILED EXPLANATION OF PREFERRED EMBODIMENT

Now, the preferred embodiment of the present invention will be explained with reference to the accompanying drawings.

Fig. 1 is a view showing configuration of a wired telephone communication system by means of wireless communication modules 100 according to the preferred embodiment of the present invention.

The wired telephone communication system by means of wireless communication modules 100 has a plurality of wireless communication modules 10a, 10b, ..., 10n. Each of the wireless communication module transmits telephone signal to wireless telephone network 300 and receives the telephone signal from the wireless telephone network 300.

The wireless telephone communication network 300 has a base station 310, a control station 330 and a switching center 350 and each of the wireless communication modules 10a, 10b, ..., 10n transmits the telephone signal to the base station 310 of the network 300 or receives the telephone signal from the base station 310 of the network 300 so that the module 10a, 10b, ..., 10n can communicate with an outside wired telephone 210 connected to the network 300 through a PSTN 200 or a mobile phone 410 which communicates with the base station 410.

The wired telephone communication system by means of wireless communication modules 100 has a wired telephone connecting part 30 and a plurality of wired telephones 1a, 1b, 1c, ... 1n are connected to the wired telephone connecting part 30 via

phone-line. Each of the wired telephones 1a, 1b, 1c, ... 1n has its own telephone number. The system 100 has an exchange part 23 which exchangeably switches the wireless communication modules 10a, 10b, 10c, ... 10n and the wired telephones 1a, 1b, 1c, ... 1n connected to the wired telephone connecting part 30. The system 100 has an announcement part 25 which announces necessary information to the wireless communication module or the wired telephone, which are switched to the exchange part 23. The exchange part 23 may be a conventional PBX (Private Branch Exchange) or KEY system. The announcement part 25 announces the information such as ring signal, communication signal or busy signal and other necessary messages as described hereinafter.

Furthermore, the system 100 has a decoder 24 which decodes the DTMF telephone signal inputted from the wireless communication module or wired telephone switched to the exchange part 23 into data.

These wireless communication modules 10a, 10b, 10c, ..., 10n, the wired telephones 1a, 1b, 1c, ... 1n, the exchange part 23, the announce part 25 and the decoder 24 are connected to a control part 21 and are under the control of the control part 21. The control part 21 includes CPU and memory and the memory stores a control program determining the operation of the CPU and data which the CPU processes. The telephone signal which is decoded into data by the decoder 24 is inputted to the control part 21 and the control part 21 establish call channel between the outside phone 410 or 210 and the wired telephone 1a, 1b,

1c, ...1n by using the telephone signal data.

With reference to Fig. 2, the exchange part 23 may be configured into a wireless communication module exchange part 232 and a wired telephone exchange part 231. The wireless communication module exchange part 232 switches the wireless communication module 10a, 10b, 10c, ..., 10n and the wired telephone exchange part 231 switches the wired telephone 1a, 1b, 1c, ..., 1n. Also, the decoder 24 is configured into a wireless communication module decoder 242 and a wired telephone decoder 241. The wireless communication module decoder 242 decodes the telephone signal from the wireless communication modules switched to the wireless communication module exchange part 232 and the wired telephone decoder 241 decodes the telephone signal from the wired telephone switched to the wired telephone exchange part 231.

The achievement of call between the outside phone 210 or 410 and one of the wired telephones 1a, 1b, 1c, ..., 1n ("object wired telephone") will be explained with reference to Fig. 3 when the outside phone 210 or 410 tries to call the object wired telephone.

Firstly, the outside phone 210 or 410 transmits telephone signal to one of the wireless communication modules 10a, 10b, 10c, ..., 10n. This signal is received to the objected wireless communication module via wireless telephone network 300 and, between the outside phone 210 or 410 and the objected wireless communication module, the communication mode is set up and maintained. That is, when a user of the outside phone 210 or

410 inputs a phone number of the wireless communication module, the outside phone 210 or 410 transmits the telephone signal and the transmitted telephone signal is received by the objected wireless communication module via the wireless telephone network 300 so that the communication mode between the outside phone and the objected wireless communication module is established (Step S301)

At this time, the switching center 350 may assign representative number to one of the wireless communication module 10a, 10b, 10c, ..., 10n and assign forwarding numbers to the remains of the wireless communication modules. In that case, when the outside phone 210 or 410 tries call by the representative number and the wireless communication module of the representative number is in use, the switching center 350 automatically forwards the telephone signal to other wireless communication module. Accordingly, the user of the outside phone 210 or 410 needs not to know all the numbers of the wireless communication modules, and can call only by the representative number.

The control part 21 is connected to the wireless communication modules 10a, 10b, 10c, ..., 10n and always checks whether the wireless communication modules 10a, 10b, 10c, ..., 10n receive the telephone signal. Accordingly, when one of the wireless communication modules receives the telephone signal, the control part 21 perceives it. (Step S302)

Then, the control part 21 controls the exchange part 23 to switch the wireless communication module receiving the telephone signal from the outside phone 210 or 410. (Step S303) Also,

the control part 21 operates the decoder 24 connected to the exchange part 23. (Step S304)

After that, the control part 21 controls the announcement part 25 to announce the message to input the own number of the object wired telephone to the wireless communication module receiving the telephone signal. (Step S305) Since the wireless communication module is in communication mode with the outside phone, the announcement is delivered to the outside telephone.

When the user of the outside phone 210 or 410 inputs the own number of the object wired telephone (Step S306), this input signal is delivered to the decoder 24 via the wireless communication module receiving the telephone signal and the exchange part 23. The input signal delivered to the decoder 24 is DTMF signal and the decoder 24 decodes the DTMF signal into data. (Step S307)

The data of the own number of the object wired telephone is inputted to and read by the control part 21 (Step S308)

Then, the control part 21 checks whether the object wired telephone is in use. (Step S309)

If the object wired telephone is in use, the control part 21 controls the announcement part 25 to announce the line-busy message to the wireless communication module in communication with the outside phone 210 or 410. Accordingly, the user of the outside phone can recognize that the object telephone is in use. (Step S310)

If the object wired telephone is not in use, the control part 21 controls the exchange part 23 to switch the object wired



telephone. (Step S311)

Then, the announcement part 25 delivers the ring signal to the object wired telephone switched to the exchange part 23. (Step S312)

By the ring, the user of the object wired telephone hooks off. (Step S313) and the communication mode between the outside phone and the object wired telephone is established. (Step S314)

Accordingly, it is possible to communicate between the outside phone and the object wired telephone by the system 100 of the present invention.

When one of the wired telephone 1a, 1b, 1c, ..., 1n tries to call the outside phone 210 or 410, the achievement of call between them will be explained with reference to Fig. 4.

Firstly, one of the wired telephone 1a, 1b, 1c, ... 1n is hooked off. (Step S401)

The control part 21 connected to the wired telephones 1a, 1b, 1c, ..., 1n always checks the status of the wired telephones 1a, 1b, 1c, ..., 1n. When one of the wired telephone 1a, 1b, 1c, ... 1n is hooked off, the control part 21 perceives it. (Step S402) Then, the control part 21 controls the exchange part 23 to switch the wired telephone (Step S403) Also, the control part 21 operates the decoder 24 connected to the exchange part 23. (Step S404)

Next, the control part 21 searches the wireless communication modules to find a wireless communication module which is not in use. (Step S405)

If the resting wireless communication module (that is

wireless communication module which is not in use) is not found, the control part 21 controls the announcement part 25 to announce the busy message to the wired telephone trying to call the outside phone. (Step S406) And the control part 21 breaks the switch between the exchange part 23 and the wired telephone trying to call. (Step S407)

If the resting wireless communication module is found, the communication mode signal is delivered to the wired telephone and the user of the wired telephone inputs the object outside phone number. (Step S408)

The DTMF signal presenting the object outside phone number is delivered to the decoder 24 via the exchange part 23 and the decoder 24 decodes the DTMF signal into data. (Step S409) The objected outside phone number data is read by the control part 21 (Step S410) and the control part 21 judges whether the input of the objected outside phone number is completed. (Step S411) For instance, the control part 21 judges that the input of the objected outside phone number is completed if no input is detected after waiting 8 seconds. Alternatively, the control part 21 may judges that the input of the objected outside phone number is completed when the user inputs special letter such as \* or #.

Then, the control part 21 switches the found resting wireless communication module to the exchange part 23. (Step S412) And, the control part 21 delivers the objected outside phone number data to the resting wireless communication module. (Step S413) For example, the control part 21 and the wireless communication

module is connected by RS 232C so that the objected outside phone number data is delivered to the resting wireless communication module. The wireless communication module transmits the telephone signal including the objected outside phone number data to the base station 310 of the wireless communication network 300.

Figs. 5 and 6 show the flow chart of the operation of the control part 21.

Firstly, Fig. 5 shows the operation of a control part 21 when trying to call the object wired telephone connected to the system 100 from the outside.

The control part 21 judges whether the wireless communication modules 10a, 10b, 10c, ..., 10n receives the telephone signal from the network 300. (Step S501)

If at least one of the wireless communication modules 10a, 10b, 10c, ..., 10n receives the telephone signal from the wireless communication network 300, the control part 21 controls the exchange part 23 to switch the wireless communication module receiving the telephone signal from the network 300 and in communication mode with the outside phone and operates the decoder 24. (Step S502)

Then, the control part 21 controls the announcement part 25 to announce the message to input the object wired telephone number. (Step S503)

The DTMF signal of the object wired telephone number is decoded into data by the decoder 24 and the control part 21 reads the data and identify the object wired telephone. (Step S504)

The control part 21 checks the object wired telephone and judges whether the object wired telephone is in use. (Step S505)

If the object wired telephone is in use, the control part 21 controls the announcement part 25 to deliver the busy signal to the wireless communication module receiving the telephone signal from the network 300 and in communication mode with the outside phone and operates the decoder 24. (Step S506)

If the object wired telephone is not in use, the control part 21 switches the object wired telephone to the exchange part 23 (Step S507) and controls the announcement part 25 to deliver the ring signal to the object wired telephone. (Step S508)

Fig. 6 shows the operation of the control part 21 when one of the wired telephone 1a, 1b, 1c, ..., 1n connected to the system 10 tries to call the outside phone 210 or 410.

Firstly, the control part 21 checks the signal status of the wired telephone 1a, 1b, 1c, ..., 1n to judges whether there is a try to call. (Step S601)

If at least one of the wired telephone 1a, 1b, 1c, ..., 1n tries to call (by hook off), the control part 21 switches the wired telephone to the exchange part 23 and operates the decoder 24 connected to the exchange part 24. (Step S602)

Then, the control part 21 searches the resting wireless communication module. (Step S603)

If the resting communication module is found, the control part 21 let the announcement part 25 deliver the communication mode signal to the wired telephone. (Step S604) And, the control part 21 reads the outside object phone number. (Step

S605)

Then, the control part 21 judges whether the input of the object outside phone number is completed. (Step S606) For example, the control part 21 determines the completion of the outside object phone number in case of no more input for 8 seconds or input of special letter.

Then, the control part 21 switches the resting wireless communication module to the exchange part 23. (Step S607) And the control part 21 inputs the object outside phone number data to the wireless communication module switched to the exchange part 23. (Step S608)

After that, the control part 21 makes the wireless communication module transmit the telephone signal to the base station 310 of the wireless telephone network 300. (Step S609)

If the resting wireless communication module is not found, the control part 21 controls the announcement part 25 to deliver the busy signal to the wired telephone trying to call (Step S610), and breaks the switch between the wired telephone and the exchange part 23 and offs the decoder 24. (Step S611)

In the wired telephone communication system by means of the wired communication module 100, the exchange part may exchangeably switch the wired telephones 1a, 1b, 1c, ..., 1n connected to the wire telephone connecting part 30 between themselves. In this case, the control part 21 recognizes that the call-try of the wired telephone is directed to the other wired telephone and exchangeably switches them by the exchange part 23. For example, when trying to call to the other wired

telephone, the user should initially inputs the special letter.

The wired telephone communication system by means of the wired communication module 100 enables the wired telephone 1a, 1b, 1c, ..., 1n conveniently to send the SMS (Short Message Service). In this case, the control part 21 has a converting means which converts button signal data inputted through the wired telephone into letter message data. The converting means converts the button signal data corresponding to the button into message data. Then, the control part 21 delivers the converted message data to the wireless communication module and the wireless communication module transmits the message data to SMSC (Short Message Service Center) via the wireless telephone network 300. Accordingly the SMSC distributes the SMS to the mobile phones.

The operation in this case is as follows.

Firstly, the wired telephone connected to the system 30 through connecting part 30 is hooked off and the control part 21 is informed of the SMS sending. For example, the press of the \*, # letter button on the wired telephone may inform the control part 21 of the SMS sending.

Then, message is inputted by pressing buttons on the telephone (for example, in such a way that message is inputted to the mobile phone for the SMS sending). Each of the button corresponds a letter. Then these button signal is received by the exchange part and is decoded into data by the decoder 24 and delivered to the control part 21. In the preferred embodiment shown in Fig. 2, the wired telephone side decoder 231 decodes

the inputted button signal into data and delivers it to the control part 21. Then, the control part 21 converts the signal into the message data and delivers the message data to the wireless communication module. The wireless communication module transmits the message data to the outside SMSC and the SMS is sent.

#### INDUSTRIAL APPLICABILITY

As described above, the present invention provides a system and a method making use of the wireless telephone network by which communication by means of wired telephone is accomplished. Especially, the system of the present invention can be provided in one box that is movable. In that case, the present invention is conveniently available for many locations. For example, the box system is placed in a camping place to which the wired telephones are connected so that people in the camp can enjoy communication with other places by means of the wired telephones.

Since the present invention makes use of the wireless communication network, the telephone charges for long distance call may be cheaper than in the normal wired telephone call making use of the PSTN.

The present invention is useful for countries in which the infrastructure of the wired telephone system is not made. By the present invention, it is needless to construct the PSTN which requires a lot of time and cost and, instead, by making use of the wireless network, people can communicate in accordance with

the present invention.

Accordingly, it is understood that the purpose of the present invention is accomplished. The present invention is described with reference to the specific embodiments, but the invention is not limited thereto. Only the following claims will determine the scope of the invention.



WHAT IS CLAIMED IS:

1. A wired telephone communication system by means of wireless communication modules comprising:

(a) a plurality of wireless communication modules each of which transmits telephone signal to wireless telephone network and receives telephone signal from the wireless telephone network;

(b) a wired telephone connecting part to which a plurality of wired telephones are connected, each of the wired telephone having its own telephone number;

(c) an exchange part which exchangeably switches the wireless communication modules and the wired telephones connected to the wired telephone connecting part;

(d) an announcement part which announces necessary information for telephone call to the wireless communication modules or the wired telephones switched to the exchange part;

(e) a decoder which decodes a telephone signal into data inputted from the wireless communication modules or the wired telephones switched to the exchange part; and

(f) a control part connected to the wireless communication modules, the wired telephones connected to the wired telephone connecting part, the exchange part, the announcement part and the decoder, the control part which controls the operation of them.

2. The wired telephone communication system by means of

wireless communication modules as set forth in claim 1 characterized in that representative telephone number is assigned to one of the wireless communication modules and forwarding numbers are assigned to the remained wireless communication modules so that when the wireless communication module of the representative telephone number is in use, the telephone signal is forwarded to other wireless communication module.

3. The wired telephone communication system by means of wireless communication modules as set forth in claim 1 or 2 characterized in that the exchange part further exchangeably switches between the wired telephones connected to the wired telephone connecting part.

4. The wired telephone communication system by means of wireless communication modules as set forth in claim 1 or 2 wherein the exchange part includes a wireless communication module exchange part which switches the wireless communication modules and a wired telephone exchange part which switches the wired telephones connected to the wired telephone connecting part, and

the decoder includes a wireless communication module decoder which decodes the telephone signal from the wireless communication modules switched to the wireless communication module exchange part and a wired telephone decoder which decodes the telephone signal from the wired telephone switched to the

wired telephone exchange part.

5. The wired telephone communication system by means of wireless communication modules as set forth in claim 1 or 2 characterized in that the control part includes

converting means which converts button signal data into corresponding letter data and the button signal corresponding to letter on button inputted through the wired telephone are decoded into the button signal data by the decoder and the button signal data is delivered to the control part in which the converting means converts the button signal data into letter data and the control part delivers the letter data to the wireless communication module which transmits the message data to the outside SMSC, by which the SMS is sent.

6. The wired telephone communication system by means of wireless communication modules as set forth in claim 1 or 2 wherein the control part includes:

(a) wireless communication module checking means for checking whether the wireless communication modules receive the telephone signal;

(b) receiving wireless communication module to exchange part switching and decoder operating means which, when the wireless communication module receives the telephone signal and communication mode is established, switches the wireless communication module to the exchange part and operates the decoder;

(c) object wired telephone identifying means which reads own number data of the object wired telephone from the decoder and identifies the object wired telephone; and

(d) object wired telephone to the exchange part switching means which switches the identified object wired telephone to the exchange part.

7. The wired telephone communication system by means of wireless communication modules as set forth in claim 6 wherein the control part further includes an object wired telephone number input announcing means which operates the announcement part to announce an information to input the object wired telephone number to the receiving wireless communication module when the receiving wireless communication module is switched to the exchange part and the decoder is operated.

8. The wired telephone communication system by means of wireless communication modules as set forth in claim 6 or claim 7 wherein the control part further includes

(a) judging means for judging whether the object wired telephone is in use by checking the telephone signal of the object wired telephone when the object wired telephone is identified; and

(b) busy information announcing means which operates the announcement part to announce that the object wired telephone is in use to the receiving wireless communication module when the object wired telephone is in use.

9. The wired telephone communication system by means of wireless communication modules as set forth in claim 1 or 2 wherein the control part includes:

(a) a judging means judging whether there is a call try by the wired telephones;

(b) wired telephones to the exchange part switching and decoder operating means which switches the wired telephone trying to call and operates the decoder;

(c) resting communication module searching means which searches the wireless communication modules in order to find a resting communication module by checking telephone signal of the wireless communication modules;

(d) outside phone identifying means which identifies an outside object phone by reading outside phone number data which is decoded by the decoder inputted through the wired telephone;

(e) resting communication module to the exchange part switching means for switching the searched resting communication module to the exchange part; and

(f) outside object phone number to resting communication module input means for inputting the outside object phone number data identified by the outside phone identifying means to the resting communication module.

10. The wired telephone communication system by means of wireless communication modules as set forth in claim 9 wherein the control part further includes busy information announcing means which operates the announcement part to announce line-busy

information to the wired telephone trying to call when the resting communication module searching means fails to find a resting communication module.

11. The wired telephone communication system by means of wireless communication modules as set forth in claim 9 or claim 10 wherein the control part further includes completion checking means for checking whether the input of the outside object phone number is completed on the wired telephone trying to call.

12. The wired telephone communication system by means of wireless communication modules as set forth in claim 3 wherein the control part includes call try identifying means between the wired telephones which identifies call try by the wired telephone is directed to the other wired telephone so that the control part controls the exchange part to switch between them.

13. Wired telephone communication method by means of wireless communication modules comprising the steps of:

(a) wireless communication module checking step by a control part for checking whether the wireless communication modules receives telephone signal;

(b) receiving wireless communication module to exchange part switching and decoder operating step for switching the wireless communication module to an exchange part and operating a decoder when at least one of the wireless communication module receives the telephone signal;

(c) object wired telephone number delivering step which decodes an object wired telephone number signal into data inputted from outside caller by the decoder and delivers the object wired telephone number data to the control part; and

(d) object wired telephone to exchange part switching step which switches the object wired telephone to the exchange part by the control part when the control part reads the object wired telephone number data and identifies the object wired telephone.

14. The wired telephone communication method by means of wireless communication modules as set forth in claim 13 further comprising the steps of an object wired telephone number input announcing step in which an announcement part announces an information to input the object wired telephone number to the receiving wireless communication module when the receiving wireless communication module is switched to the exchange part and the decoder is operated.

15. The wired telephone communication method by means of wireless communication modules as set forth in claim 13 or claim 14 further comprising the steps of:

(a) judging step in which the control part judges whether the object wired telephone is in use by checking the telephone signal of the object wired telephone when the object wired telephone is identified; and

(b) busy information announcing step in which the announcement part announces that the object wired telephone is

in use to the receiving wireless communication module when the object wired telephone is in use.

16. Wired telephone communication method by means of wireless communication modules comprising the steps of:

(a) wired telephone call-try judging step by a control part for judging whether there is a call try by wired telephones;

(b) wired telephones to the exchange part switching and decoder operating step which switches the wired telephone trying to call to an exchange part and operates a decoder connected to the exchange part;

(c) resting communication module searching step which searches wireless communication modules in order to find a resting communication module by checking telephone signal of the wireless communication modules;

(d) outside object phone number delivering step in which the decoder decodes outside object phone number signal from the wired telephone trying to call into data and the outside object phone number data is delivered to the control part;

(e) outside object phone number identifying step in which the control part reads the outside object phone number data and identifies the outside object phone;

(f) resting communication module to the exchange part switching step for switching the searched resting communication module to the exchange part; and

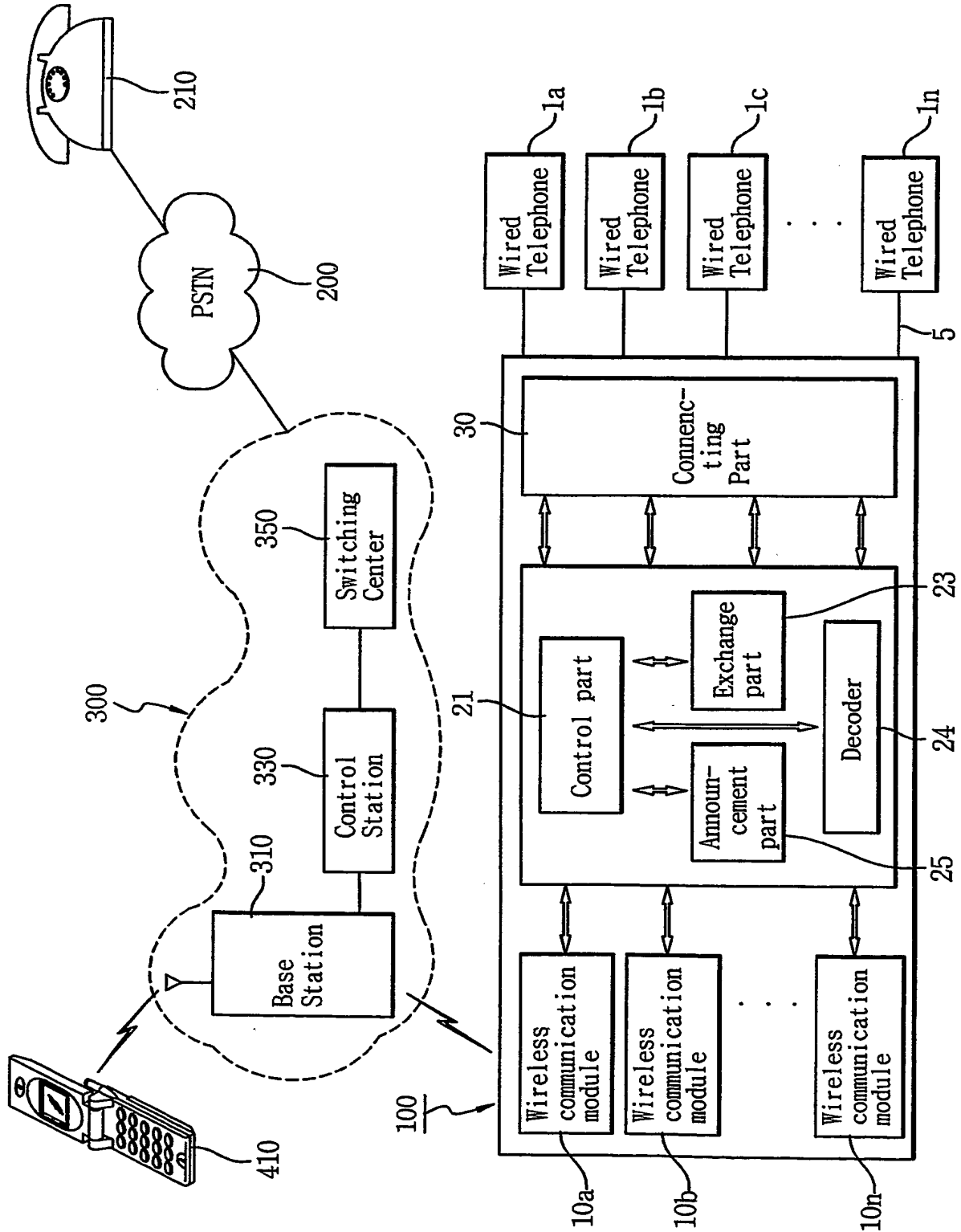
(g) outside object phone number to resting communication module input step for inputting the identified outside object



phone number data to the resting communication module.

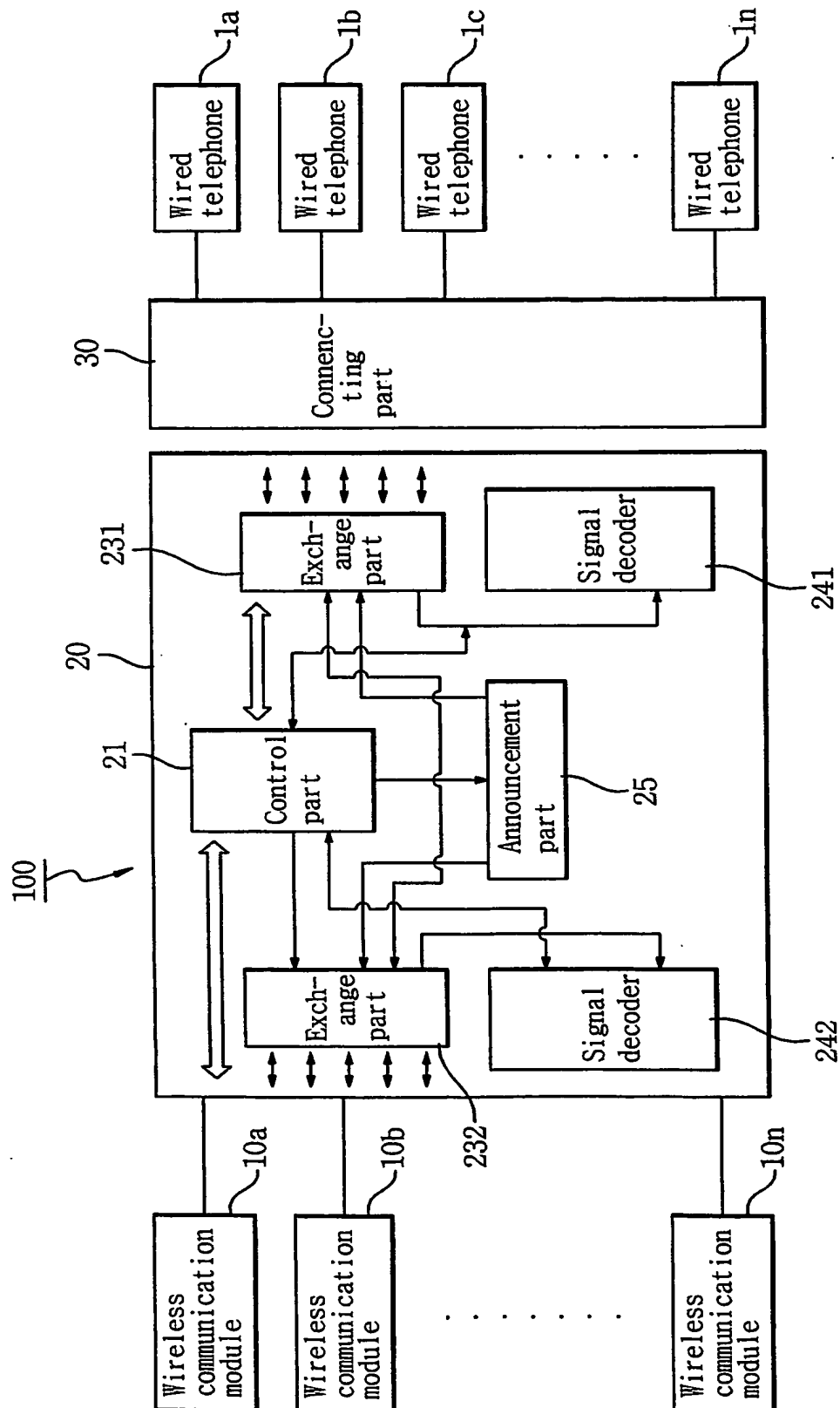
17. The wired telephone communication method by means of wireless communication modules as set forth in claim 16 further comprising the steps of busy information announcing step which operates the announcement part to announce line-busy information to the wired telephone trying to call when there is a fail to find a resting communication module in the resting communication module searching step.

FIG. 1



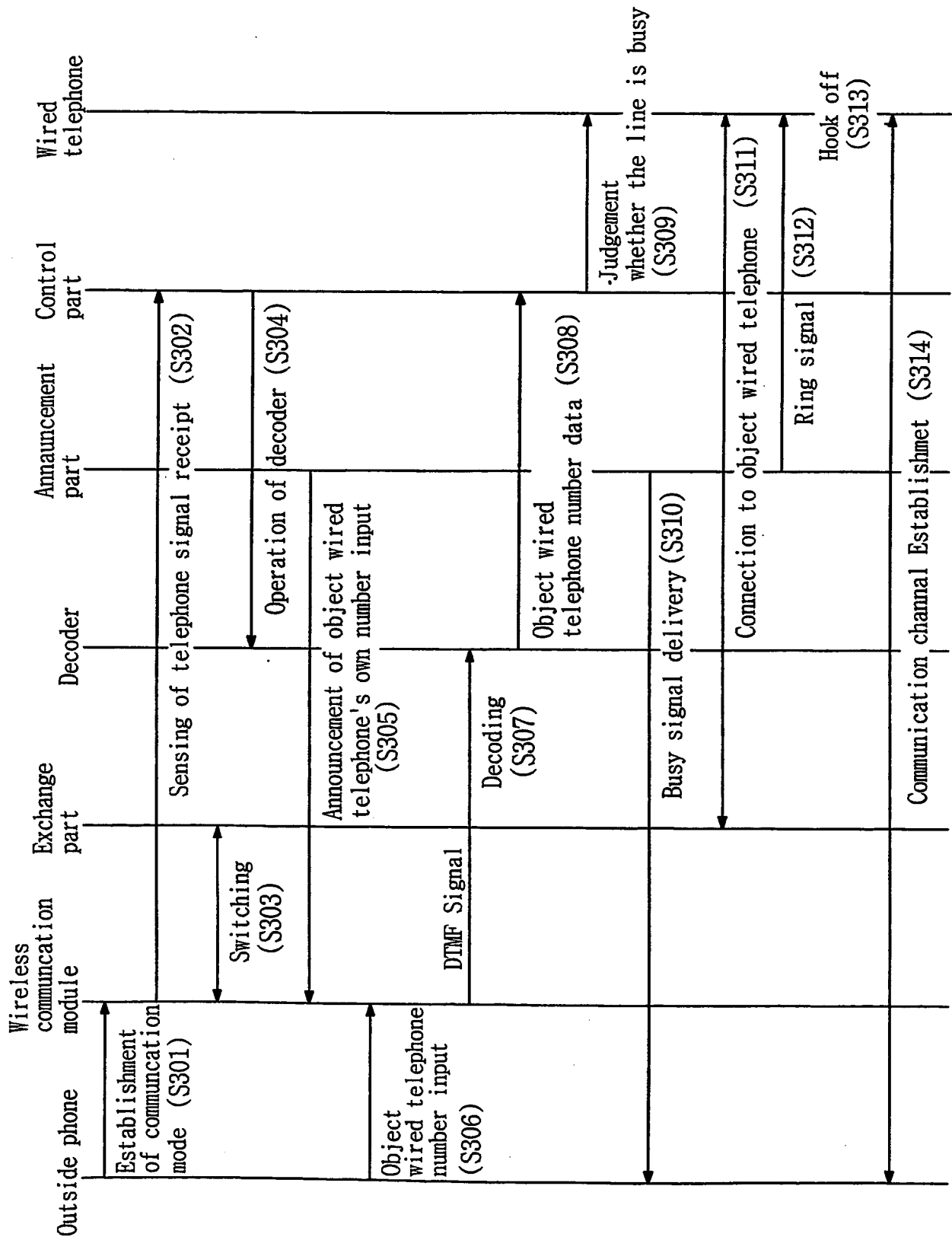
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FIG. 2



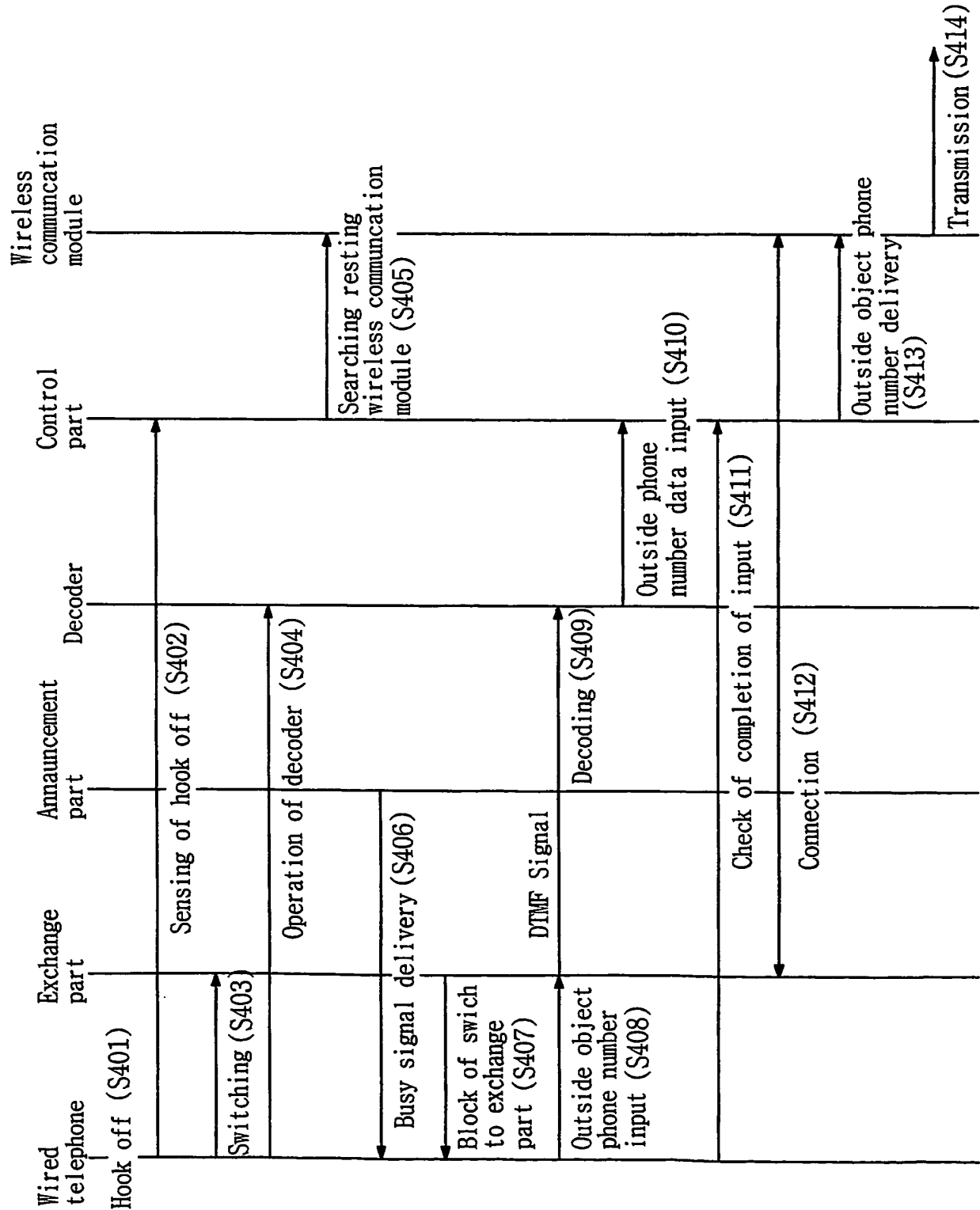
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FIG. 3



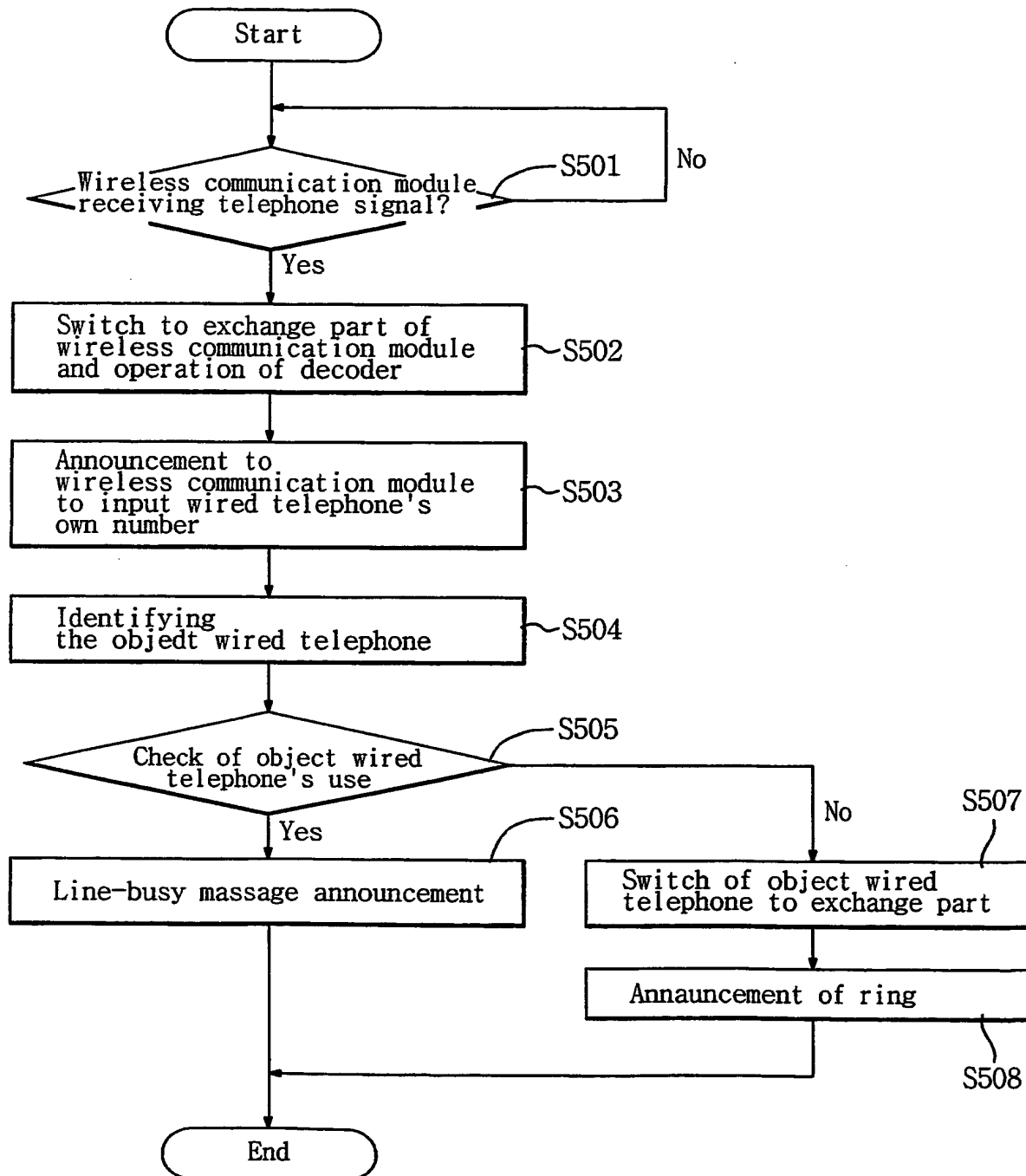
4/6

FIG. 4



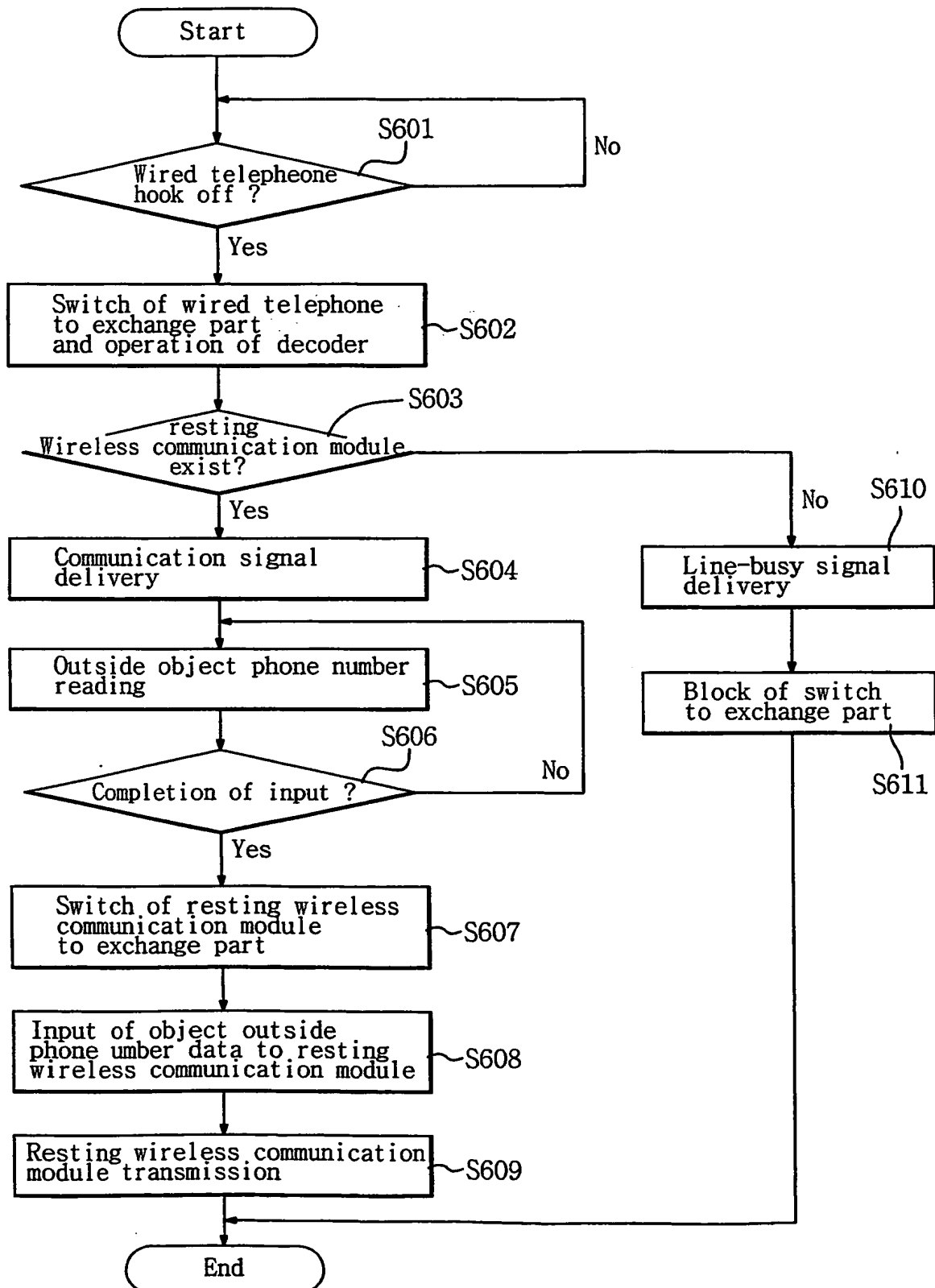
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FIG. 5



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FIG. 6



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR02/00219

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 H04M 1/72, H04Q 7/24, H04Q 7/36**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR; IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,771,453 A1 (Ericsson Inc.) 23 June 1998 See the whole document	1-17
A	US 5,898,931 A1 (Hewlett-Packard Company) 27 April 1999 See the whole document	1-17

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

08 APRIL 2002 (08.04.2002)

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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR02/00219

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